

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS:

Claims 1-24 (Cancelled)

25. (New) An information recording medium on which record information is recorded by forming a record mark, wherein

additional information is recorded by changing an average area of the record mark included in each predetermined first cycle, in comparison with a predetermined reference value, and the additional information is phase-modulated and recorded.

26. (New) The information recording medium according to claim 25, wherein

the record information is recorded in synchronization with a synchronization signal which appears in each predetermined second cycle, and

the additional information is recorded, by using the second cycle of the synchronization signal as the first cycle.

27. (New) The information recording medium according to claim 26, wherein the additional information is recorded, by using a cycle of a timing signal which is generated on the basis of the synchronization signal as the first cycle, instead of using the second cycle as the first cycle.

28. (New) The information recording medium according to claim 26, wherein the synchronization signal is a synchronization block which is included in a synchronization frame which is an information unit for recording the record information.

29. (New) The information recording medium according to claim 25, wherein

at least one portion of' said information recording medium comprises a PEP area in which PEP information is recorded by combining a mark area in which a plurality of record marks are formed and an unrecorded area in which the record mark is not found, and

the additional information is recorded by changing the average area of the plurality of record marks in the mark area.

30. (New) The information recording medium according to claim 25, wherein the additional information is recorded by changing at least one of an average length and an average width of the record mark in the each predetermined first cycle.

31. (New) The information recording medium according to claim 30, wherein the additional information is recorded by changing at least one of the average length and the average width such that at least one of the average length and the average width becomes long or short.

32. (New) The information recording medium according to claim 25, wherein a plurality of same additional information are

repeatedly recorded.

33. (New) An information reproducing apparatus for reproducing the record information recorded on-said information recording medium according to claim 25 on which record information is recorded by forming a record mark. wherein additional information is recorded by changing an average area of the record mark included in each predetermined first cycle, in comparison with a predetermined reference value, and the additional information is phase-modulated and recorded,

said information reproducing apparatus comprising
a reproducing device for reproducing the record information and. obtaining a reproduction signal;

an integrating device for obtaining an integrated value of the reproduction signal in the each first cycle obtained by said reproducing device; and

a generating device for generating the additional information on the basis of the integrated value obtained by said integrating device.

34. (New) The information reproducing apparatus according to claim 33, wherein

the record information is recorded in synchronization with a synchronization signal which appears in each predetermined second cycle,

said information reproducing apparatus further comprises a synchronization signal detecting device for detecting the synchronization signal, and

said integrating device obtains the integrated value, by using the second cycle of the synchronization signal detected by said synchronization signal detecting device as the first cycle.

35. (New) The information reproducing apparatus according to claim 34, wherein said integrating device obtains the integrated value, by using a cycle of a timing signal which is generated on the basis of the synchronization signal detected by said synchronization signal detecting device as the first cycle, instead of using the second cycle as the first cycle,

36. (New) The information reproducing apparatus according to claim 33, wherein said integrating device resets the integrated value in the each first cycle.

37. (New) The information reproducing apparatus according to claim 33, wherein

at least one portion of said information recording medium comprises a PEP area in which PEP information is recorded by combining a mark area in which a plurality of record marks are formed and an unrecorded area in which the record mark is not formed, and the additional information is recorded by changing the average area of the plurality of record marks in the mark area, in comparison with the reference value,

said reproducing device obtains a PEP signal by reproducing the PEP information in the PEP area, and

said integrating device obtains an integrated value of the PEP signal by using a cycle in each which the PEP information is detected as the first cycle, instead of or in addition to obtaining the integrated value of the reproduction signal in the each first cycle.

38. (New) The information reproducing apparatus according to

claim 33, wherein

a plurality of same additional information are repeatedly recorded on said information recording medium,

said information reproducing apparatus further comprises a plurality of storing devices, each of which is for adding the integrated value obtained by said integrating device in each of the plurality of same additional information repeatedly recorded and for storing it therein, and

said generating device generates the additional information on the basis of the added integrated value.

39. (New) The information reproducing apparatus according to claim 38, wherein said integrating device resets the added integrated value, in at least one case of a case where the integrated value stored in each of the plurality of storing devices is larger than a predetermined threshold value and a case where a certain time elapses.

40. (New) An information reproducing method of reproducing the record information recorded on said an information recording medium on which record information is recorded by forming a record mark, wherein additional information is recorded by changing an average area of the record mark included in each predetermined first cycle, in comparison with a predetermined reference value, and the additional information is phase-modulated and recorded,

said information reproducing method comprising:

a reproducing process of reproducing the record information and obtaining a reproduction signal;

an integrating process of obtaining an integrated value of the reproduction signal in the each first cycle obtained by said reproducing process; and

a generating process of generating the additional information on the basis of the integrated value obtained by said integrating process.

41. (New) An information recording apparatus for recording record information onto an information recording medium,

said information recording apparatus comprising:

a recording signal generating device for generating a recording signal for forming a record mark onto said information recording medium, on the basis of the record information;

an additional signal adding device for adding an additional signal to the recording signal, the additional signal indicating additional information which is recorded by changing an average area of the record mark in each predetermined first cycle, in comparison with a predetermined reference value; and

a recording device for recording the record information and the additional information by forming the record mark while changing the average area, on the basis of the recording signal to which the additional signal is added, wherein

the additional information is phase-modulated and recorded.

42. (New) The information recording apparatus according to claim 41, wherein

said information recording apparatus further comprises a synchronization signal generating device for generating a synchronization signal which appears in each predetermined second cycle,

said recording signal generating device generates the recording signal for forming the record mark in synchronization with the generated synchronization signal, and

said additional signal adding device adds the additional signal, by using the second cycle as the first cycle.

43. (New) The information recording apparatus according to claim 42, wherein said additional signal adding device adds the additional signal, by using a cycle of a timing signal which is generated on the basis of the synchronization signal as the first cycle.

44. (New) The information recording apparatus according to claim 41, wherein said recording device forms the record mark by irradiating laser light on the basis of a predetermined driving pulse, and irradiates the laser light while changing at least a pulse width of the driving pulse on the basis of the recording signal to which the additional signal is added.

45. (New) An information recording method of recording record information onto an information recording medium,

said information recording method comprising:

a recording signal generating process of generating a recording signal for forming a record mark onto said information recording medium, on the basis of the record information;

an additional signal adding process of adding an additional signal to the recording signal, the additional signal indicating additional information which is recorded by changing an average area of the record mark in each predetermined first cycle, in comparison with a predetermined reference value; and

a recording process of recording the record information and the additional information by forming the record mark while changing the average area, on the basis of the recording signal to which the additional signal is added, wherein

the additional information is phase-modulated and recorded.

46. (New) A computer program product in a computer-readable medium for tangibly embodying a program of instructions executable by a computer provided in an information reproducing apparatus, said computer program product making the computer function as at least one portion of a reproducing device, an integrating device, and a generating device,

said information reproducing apparatus for reproducing the record information recorded on an information recording medium on which record information is recorded by forming a record mark, wherein additional information is recorded by changing an average area of the record mark included in each predetermined first cycle, in comparison with a predetermined reference value, and the additional information is phase-modulated and recorded,

said information reproducing apparatus comprising:

said reproducing device for reproducing the record information and obtaining a reproduction signal

said integrating device for obtaining an integrated value of the reproduction signal in the each first cycle obtained by said reproducing device; and

said generating device for generating the additional information on the basis of the integrated value obtained by said integrating device.

47. (New) A computer program product in a computer-readable medium for tangibly embodying a program of instructions executable by a computer provided in an information recording apparatus, said computer program product making the computer function as at least one portion of a recording signal generating device, an additional signal adding device, and an recording device,

said information recording apparatus for recording record

information onto an information recording medium,

said information recording apparatus comprising:

said recording signal generating device for generating a recording signal for forming a record mark onto said information recording medium, on the basis of the record information;

said additional signal adding device for adding an additional signal to the recording signal, the additional signal indicating additional information which is recorded by changing an average area of the record mark in each predetermined first cycle, in comparison with a predetermined reference value; and

said recording device for recording the record information and the additional information by forming the record mark while changing the average area on the basis of the recording signal to which the additional signal is added, wherein

the additional information is phase-modulated and recorded.